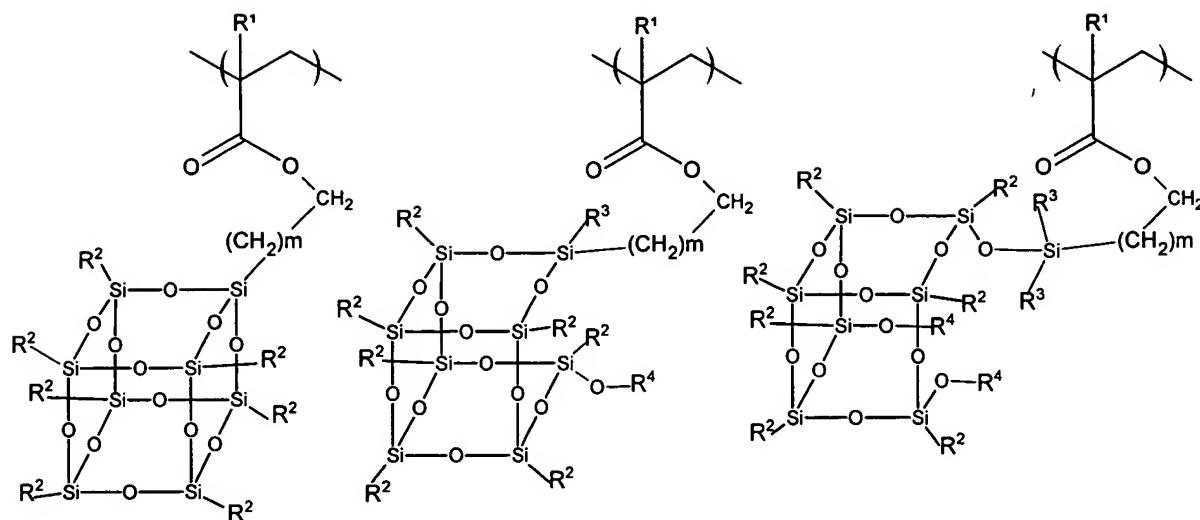


We claim:

1. A copolymer comprising:

at least one Structure (I) first repeating unit comprising one or more repeating units selected from the group consisting of units represented by Structure (IA),
5 Structure (IB) and Structure (1C)

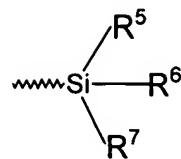


Structure (IA)

Structure (IB)

Structure (IC)

10 wherein each R^1 is independently a selected from the group consisting of hydrogen atom or a methyl group; R^3 is selected from the group consisting of a linear, branched and cyclic alkyl or alicyclic group having 1 to 20 carbon atoms; m is an integer from about 2 to about 10; each R^4 is independently be selected from the group consisting of H and Structure (II),

**Structure (II)**

wherein R⁵, R⁶ and R⁷ are each independently selected from the group consisting of a linear, branched or cyclic alkyl, alicyclic and fluoroalkyl group having 1 to 20 carbon atoms; and

each R² is independently selected from the group consisting of

(a) a linear, branched or cyclic alkyl unsubstituted or substituted alicyclic group, having 1 to 20 carbon atoms;

(b) A linear, branched or cyclic fluoroalkyl or fluorine substituted alicyclic group having 1 to 20 carbon atoms; and

(c) a polar group selected from the group consisting of

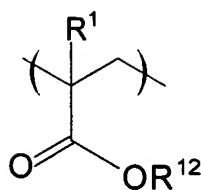
(1) (CH₂)_n—OR⁸, where n is an integer from about 2 to about 10 and R⁸ is selected from the group consisting of H, R³ group and α-alkoxy alkyl group; R³ is a linear, branched or cyclic alkyl or alicyclic group having 1 to 20 carbon atoms;

(2) (CH₂)_n—(C=O)—OR⁹, where n is an integer from about 2 to about 10 and R⁹ is selected from the group consisting of H, R³ group and an acid sensitive protecting group; R³ is a linear, branched or cyclic alkyl or alicyclic group having 1 to 20 carbon atoms;

(3) (CH₂)_n—C(CF₃)R¹⁰—OR¹¹, where n is an integer from about 2 to about 10 and R¹⁰ is selected from the group consisting of H, fluoromethyl, difluoromethyl, and trifluoromethyl and R¹¹ is selected from the group consisting of H and an R³ alkyl group; and

(4) (CH₂)_n—O—(C=O)R³, where n is an integer from about 2 to about 10; and R³ is a linear, branched or cyclic alkyl or alicyclic group having 1 to 20 carbon atoms; and

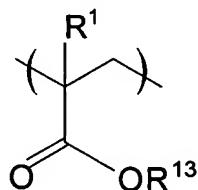
a second repeating unit represented by Structure (III)



Structure (III)

wherein R¹ has the same meaning as defined above and R¹² is an acid labile group, with the proviso that when Structure (IA) is present in the copolymer and R¹² is t-Bu, an additional repeating unit having Structure(IV), or Structure (VI), or a repeating unit derived from an ethylenically unsaturated, polymerizable silicon compound different from Structures (IA), (IB), and (IC), as defined hereinafter, must be present, and where Structure (IV) is as follows:

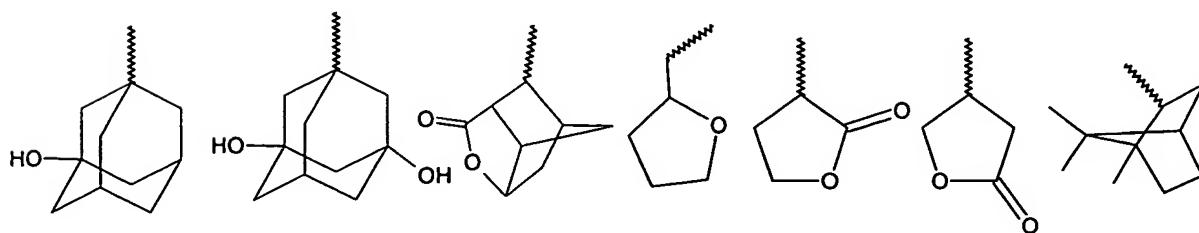
10



Structure (IV)

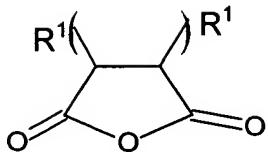
wherein R¹ has the same meaning as defined above and R¹³ is selected from the group consisting of the following structures (Va – Vg).

15



(Va) (Vb) (Vc) (Vd) (V) (Vf) (Vg)

and Structure (VI) is

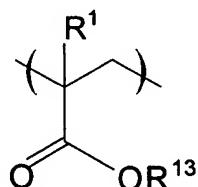


5

Structure (VI)

where R¹ has the meaning as defined above.

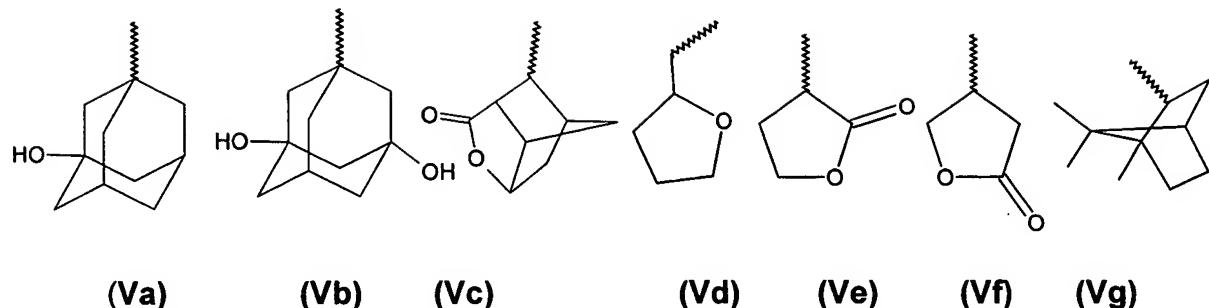
10 2. A copolymer of claim 1 additionally comprising at least one additional repeating unit selected from the group consisting of Structures (IV) and (VI)



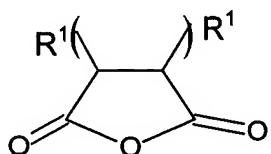
15

Structure (IV)

wherein R¹ has the same meaning as defined above in claim 1 and R¹³ is selected from the following structures (Va – Vg).



5



Structure (VI)

and R^1 has the meaning as defined above in claim 1.

10

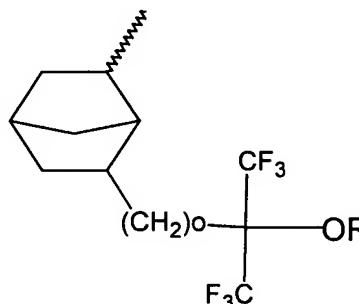
3. A copolymer of claim 2 wherein the repeating unit represented by Structures (IA), (IB) or (IC) is from about 5 molar % to about 25 molar % of all repeating units constituting the copolymer; the repeating unit represented by Structure (III) is from about 20 molar % to about 50 molar % of all repeating units constituting the copolymer; the repeating unit represented by Structure (IV) when present in the copolymer is from about 20 molar % to about 50 molar % of all repeating units constituting the copolymer; and the repeating unit represented by Structure (VI) when present in the copolymer is from about 1 molar % to about 40 molar % of all repeating units constituting the copolymer.

20

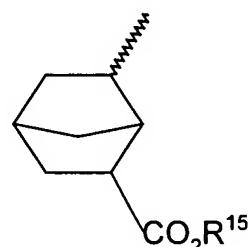
4. A copolymer of claim 1 additionally comprising a repeating unit derived from a ethylenically unsaturated, polymerizable silicon compound different from Structures (IA), (IB), and (IC).
5. A copolymer of claim 4 wherein the repeating unit derived from an ethylenically unsaturated, polymerizable silicon compound different from Structures (IA), (IB), and (IC) is from about 20 molar % to about 50 molar % of all repeating units constituting the copolymer.
- 10 6. A copolymer of claim 2 additionally comprising a repeating unit derived from a ethylenically unsaturated, polymerizable silicon compound different from Structures (IA), (IB), and (IC).
- 15 7. A copolymer of claim 2 comprising repeating units of Structure (I), Structure (III) and Structure (VI).
8. A copolymer of claim 7 additionally comprising at least one repeating unit derived from an ethylenically unsaturated, polymerizable silicon compound different from Structures (IA), (IB), and (IC).
- 20 9. A copolymer of claim 8 wherein the repeating unit derived from an ethylenically unsaturated, polymerizable silicon compound different from Structures (IA), (IB), and (IC) is from about 15 molar % to about 45 molar % of all repeating units constituting the copolymer.
- 25 10. The copolymer of claim 1 having a weight average molecular weight, in terms of polystyrene, of from about 7,000 to about 30, 000.
11. The copolymer of claim 1 wherein the level of silicon in the copolymer is from 30 about 4 to about 15% by weight.

nonafluoropentylsilyl, dimethyl-3,3,3,4,4,4,5,5,5-nonafluoropentylsilyl,
 dimethyl-3,3,3-trifluoropropylsilyl, dimethyl-3,3,3,4,4,4,5,5,5,6,6,6-
 dodecafluorohexylsilyl, dimethyl-3,3,3,4,4,4,5,5,5,6,6,7,7,7-
 pentadecadecafluoroheptylsilyl, and dimethyl-3,3,3,4,4,4,5,5,5,6,6,6,7,7,7,8,8-
 5 octadecafluoroctylsilyl;

and each R² substituted alicyclic group is an alicyclic moiety substituted by one or more substituents at any open valence and said substituents on the alicyclic moiety are selected from the group consisting of linear, branched or cyclic alkyl groups, hydroxyl groups, hydroxyalkyl groups of Structure (VII) and ester groups of Structure (VIII).



Structure (VII)



Structure (VIII)

15 wherein R¹⁴ is selected from the group consisting of hydrogen, a linear, branched or cyclic alkyl and alicyclic group having 1 to 20 carbon atoms and o is an integer about 1 to 10; R¹⁵ is selected from the group consisting of hydrogen, a linear, branched or cyclic alkyl and alicyclic group having 1 to 20 carbon atoms, and an acid labile group.

20 14. The copolymer of claim 13 wherein R¹⁴ is selected from the group consisting of methyl, ethyl, propyl, isopropyl, n-butyl, sec-butyl, tert-butyl, cyclohexyl, cyclopentyl, octyl, cyclooctyl, cyclononyl, cyclodecyl, norbornyl, isobornyl, adamantlyl, adamantlylmethylene, tricyclo[5,2,1,0^{2,6}]decanemethylene and tetracyclo[4,4,0,1^{2,5},1^{7,10}]dodecyl; and

25 R¹⁵ is selected from the group consisting of methyl, ethyl, propyl, isopropyl, n-butyl, sec-butyl, tert-butyl, cyclohexyl, cyclopentyl, octyl, cyclooctyl,

cyclononyl, cyclodecyl, norbornyl, isobornyl, adamantyl, adamantlylmethylene, tricyclo[5,2,1,0^{2,6}]decanemethylene, tetracyclo[4,4,0,1^{2,5},1^{7,10}]dodecyl and the acid labile protecting group in R¹⁵ is selected from the group consisting of tert-butyl group, 1,1-dimethylpropyl group, 1-methyl-1-ethylpropyl group, 1,1-diethylpropyl group, 1,1-dimethylbutyl group, 1-methyl-1-ethylbutyl group, 1,1-diethyl butyl group, 1,1-dimethylpentyl group, 1-methyl-1-ethylpentyl group, 1,1-diethylpentyl group, 1,1-dimethylhexyl group, 1-methyl-1-ethylhexyl group, 1,1-diethylhexyl group, 1-methyl-1-cyclopentyl, 1-ethyl-1-cyclopentyl, 1-propyl-1-cyclopentyl, 1-butyl-1-cyclopentyl, 1-methyl-1-cyclohexyl, 1-ethyl-1-cyclohexyl, 1-propyl-1-cyclohexyl, 1-butyl-1-cyclohexyl, 2-methyl-2-adamantyl, 2-ethyl-2-adamantyl, 2-propyl-2-adamantyl, 2-butyl-2-adamantyl, 2-isopropyl-2-adamantyl, 1,1-dimethyl-3-oxobutyl, 1-ethyl-1-methyl-3-oxobutyl, 1-methyl-1-cyclohexyl-3-oxobutyl, 1,1-dimethyl-3-oxopentyl, and tetrahydropyran-2-yl.

15 15. The copolymer of claim 13 wherein Structure (VII) is selected from the group consisting of 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propan-2-ol, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)butyl-2-ol, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxomethyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxoethyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxopropyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxo-n-butyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxo-tertbutyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxocyclohexyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxooctyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxocyclooctyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxocyclononyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxocyclodecyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxonorbornyl I, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxoisobornyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxoadamantyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-

trifluoromethyl)propyl-2-oxo adamantylmethlene, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxotricyclo[5,2,1,0^{2,6}]decanemethylene, bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxo and tetracyclo[4,4,0,1^{2,5},1^{7,10}]dodecyl; and Structure (VII) is selected from the group consisting of 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propan-2-ol, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxomethyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxoethyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxopropyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxo-n-butyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxo-tertbutyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxocyclohexyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxooctyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxocyclooctyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxocyclononyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxocyclodecyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxonorbornyl, 1,5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxoisobornyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxoadamantyl, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxo adamantylmethlene, 5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxotricyclo[5,2,1,0^{2,6}]decanemethylene, bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-trifluoromethyl)propyl-2-oxo and tetracyclo[4,4,0,1^{2,5},1^{7,10}]dodecyl; and Structure (VIII) is selected from the group consisting of 5-(methoxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(ethoxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(n-butoxy carbonyl-2-bicyclo[2.2.1]heptyl), 5-(sec-butoxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(tert-butoxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(cyclohexyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(cyclopentyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(octyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(cyclooctyloxycarbonyl-2-

bicyclo[2.2.1]heptyl), 5-(cyclononyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(cyclodecyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(norbornyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(isobornyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(adamantyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(adamantylmethyleneloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(tricyclo[5.2.1,0^{2,6}]decanemethyleneloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(tetracyclo[4.4.0,1^{2,5},1^{7,10}]dodecyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1,1-dimethylpropyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1-methyl-1-ethylpropyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1,1-diethylpropyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1,1-dimethylbutyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1,1-diethylbutyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1,1-dimethylpentyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1-methyl-1-ethylpentyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1,1-dimethylhexyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1-methyl-1-ethylhexyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1,1-diethylhexyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(2-methyl-1-cyclohexyloxyoxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1-ethyl-1-cyclohexyloxyoxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1-propyl-1-cyclohexyloxyoxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1-butyl-1-cyclohexyloxyoxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(2-ethyl-2-adamantyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(2-propyl-2-adamantyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(2-butyl-2-adamantyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(2-isopropyl-2-adamantyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1,1-dimethyl-3-oxobutyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1-ethyl-1-methyl-3-oxobutyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1-methyl-1-cyclohexyl-3-oxobutyloxycarbonyl-2-bicyclo[2.2.1]heptyl), 5-(1,1-dimethyl-3-oxopentyloxycarbonyl-2-bicyclo[2.2.1]heptyl),

bicyclo[2.2.1]heptyl), 5-(bicyclo[2.2.1]heptyl).

16. The copolymer of claim 1 wherein

5 when R² is a polar group (CH₂)_n-O-(C=O)R³, the polar group is selected from the group consisting of acetoxyethyl, acetoxypropyl, acetoxybutyl, acetoxypentyl, acetoxyhexyl, acetoxyheptyl, acetoxyoctyl, ethylcarbonyloxyethyl, ethylcarbonyloxypropyl, ethylcarbonyloxybutyl, and propylcarbonyloxyethyl;

10

when R² is a linear, branched or cyclic fluoroalkyl or fluoro substituted alicyclic group having 1 to 20 carbon atoms R² is selected from the group consisting of trifluoromethyl, difluoromethyl, 2,2,2-trifluoroethyl, pentafluoroethyl, 3,3,3-trifluoropropyl, 1,1,1,3,3,3-hexafluoroisopropyl, 3,3,3,4,4,4-hexafluorobutyl, 15 3,3,3,4,4,4,5,5,5-nonafluoropentyl, 3,3,3,4,4,4,5,5,5,6,6,6-dodecafluorohexyl, 3,3,3,4,4,4,5,5,5,6,6,6,7,7,7-pentadecafluoroheptyl, 3,3,3,4,4,4,5,5,5,6,6,6,7,7,7,8,8,8-octadecafluoroctyl1,2,2,3,3,4,4,5-octafluorocyclopentyl and 2-(octafluoro-1-trifluoromethylcyclopentyl)ethyl;

20

when R² is a polar group (CH₂)_n-OR⁸, the polar group is selected from the group consisting of ethyl-1-oxomethyl, ethyl-1-oxoethyl, ethyl-1-oxopropyl, ethyl-1-oxoisopropyl, ethyl-1-oxo-n-butyl, ethyl-1-oxo-sec-butyl, ethyl-1-oxo-tert-butyl, ethyl-1-oxo-cyclohexyl, ethyl-1-oxo-cyclopentyl, ethyl-1-oxocycloheptyl, ethyl-1-oxooctyl, ethyl-1-oxocyclooctyl, ethyl-1-oxocyclononyl, ethyl-1-oxocyclodecyl, ethyl-1-oxonorbornyl, ethyl-1-oxoisobornyl, ethyl-1-oxoadamantyl, ethyl-1-oxoadamantylmethylen, ethyl-1-oxotricyclo[5,2,1,0^{2,6}]decanemethylene, ethyl-1-oxotetracyclo[4,4,0,1^{2,5},1^{7,10}]dodecyl, propyl-1-oxomethyl, propyl-1-oxoethyl, butyl-1-oxomethyl, penyl-1-oxomethyl, hexyl-1-oxomethyl, heptyl-1-oxomethyl, octyl-1-oxomethyl, nonanyl-1-oxomethyl, decyl-1-oxomethyl, ethyl-1-oxo- α -methoxymethyl, and ethyl-1-oxo- α -methoxyethyl;

when R^2 is a polar group $(CH_2)_n-(C=O)-OR^9$, the polar group is selected from the group consisting of tert-butyloxycarbonylethyl, tert-butyloxycarbonylpropyl, tert-butyloxycarbonylbutyl, tert-butyloxycarbonylpentyl, tert-butyloxycarbonylhexyl, tert-butyloxycarbonylheptyl, tert-butyloxycarbonyloctyl, 1,1-dimethylpropyloxycarbonylethyl, 1-methyl-1-ethylpropyloxycarbonylethyl, 1,1-diethylpropyloxycarbonylethyl, 1,1-dimethylbutyloxycarbonylethyl, 1-methyl-1-ethylbutyloxycarbonylethyl, 1,1-diethyl butyloxycarbonylethyl, 1,1-dimethylpentyloxycarbonylethyl, 1-methyl-1-ethylpentyloxycarbonylethyl, 1,1-diethylpentyloxycarbonylethyl, 1,1-dimethylhexyloxycarbonylethyl, 1-methyl-1-ethylhexyloxycarbonylethyl, 1,1-diethylhexyloxycarbonylethyl and the like, 1-methyl-1-cyclohexyloxycarbonylethyl, 1-ethyl-1-cyclohexyloxycarbonylethyl, 1-propyl-1-cyclohexyloxycarbonylethyl, 1-butyl-1-cyclohexyloxycarbonylethyl, 2-methyl-2-adamantyloxycarbonylethyl, 2-ethyl-2-adamantyloxycarbonylethyl, 2-propyl-2-adamantyloxycarbonylethyl, 2-butyl-2-adamantyloxycarbonylethyl, and 2-isopropyl-2-adamantyloxycarbonylethyl and 1,1-dimethyl-3-oxobutyl, 1-ethyl-1-methyl-3-oxobutyl, 1-methyl-1-cyclohexyl-3-oxobutyloxycarbonylethyl, 1,1-dimethyl-3-oxopentyloxycarbonylethyl, and tetrahydropyran-2-yloxycarbonylethyl; and

trifluormethyl)pentaloxymethyl, (1,1,1-trifluoro-2-trifluormethyl)hexaloxymethyl, and (1,1,1-trifluoro-2-trifluormethyl)heptaloxymethyl.

17. The copolymer of claim 1 wherein the monomer generating the repeating unit
 5 Structure (IA) after polymerization, is a monomer selected from the group
 consisting of 3-(3,5,7,9,11,13,15-
 heptaethylpentacyclo[9.5.1.1^{3,9}.1^{5,15}.1^{7,13}]octa-siloxan-1-yl)propyl acrylate, 3-
 (3,5,7,9,11,13,15-heptaethylpentacyclo[9.5.1.1^{3,9}.1^{5,15}.1^{7,13}]octa-siloxan-1-yl)
 10 propyl methacrylate, 3-(3,5,7,9,11,13,15-heptamethylpentacyclo
 [9.5.1.1^{3,9}.1^{5,15}.1^{7,13}]octa-siloxan-1-yl)propyl methacrylate, 3-(3,5,7,9,11,13,15-
 heptapropylpentacyclo[9.5.1.1^{3,9}.1^{5,15}.1^{7,13}]octa-siloxan-1-yl)propyl
 15 methacrylate, 3-(3,5,7,9,11,13,15-hepta-tert-
 butylpentacyclo[9.5.1.1^{3,9}.1^{5,15}.1^{7,13}]octa-siloxan-1-yl)propyl methacrylate, 3-
 (3,5,7,9,11,13,15-heptacyclopentylpentacyclo [9.5.1.1^{3,9}.1^{5,15}.1^{7,13}]octa-
 20 siloxan-1-yl)propyl methacrylate, 3-(3,5,7,9,11,13,15-
 heptacyclohexylpentacyclo [9.5.1.1^{3,9}.1^{5,15}.1^{7,13}]octa-siloxan-1-yl) propyl
 methacrylate, 3-(3,5,7,9,11,13,15-
 heptaethylpentacyclo[9.5.1.1^{3,9}.1^{5,15}.1^{7,13}]octa-siloxan-1-yl) butyl methacrylate,
 25 3-(3,5,7,9,11,13,15-heptaethylpentacyclo[9.5.1.1^{3,9}.1^{5,15}.1^{7,13}]octa-siloxan-1-
 yl)pentyl methacrylate, 3-(3,5,7,9,11,13,15-heptaethylpentacyclo
 [9.5.1.1^{3,9}.1^{5,15}.1^{7,13}]octa-siloxan-1-yl)hexyl methacrylate, 3-(3,5,7,9,11,13,15-
 heptakis(3,3,3,4,4,4,5,5,5,6,6,6,7,7,7,8,8,8-octadecafluoroctyl)pentacyclo
 30 [9.5.1.1^{3,9}.1^{5,15}.1^{7,13}]octa-siloxan-1-yl)propyl methacrylate, 3-
 (3,5,7,9,11,13,15-heptakis{5-bicyclo[2.2.1]heptyl-2-(1,1,1-trifluoro-2-
 trifluoromethyl)propyl-2-oxomethyl})pentacyclo[9.5.1.1^{3,9}.1^{5,15}.1^{7,13}]octa-
 siloxan-1-yl)propyl methacrylate, 3-(3,5,7,9,11,13,15-heptakis(tert-
 butyl)pentacyclo[9.5.1.1^{3,9}.1^{5,15}.1^{7,13}]octa-siloxan-1-yl) propyl methacrylate;

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the monomer generating the repeating unit of Structure (IB) after
 polymerization is a monomer selected from the group consisting of 3-(13-

hydroxy-1,3,5,9,11,13,15-heptamethyl-7-methyltetracyclo[9.5.1.1^{3,9}.1^{5,15}]octa-siloxan-7-yl)propyl acrylate, 3-(13-hydroxy-1,3,5,9,11,13,15-heptaethyl-7-methyltetracyclo[9.5.1.1^{3,9}.1^{5,15}]octa-siloxan-7-yl)propyl methacrylate, 3-(13-hydroxy-1,3,5,9,11,13,15-heptamethyl-7-methyltetracyclo[9.5.1.1^{3,9}.1^{5,15}]octa-siloxan-7-yl)butyl acrylate, 3-(13-hydroxy-1,3,5,9,11,13,15-heptamethyl-7-ethyltetracyclo[9.5.1.1^{3,9}.1^{5,15}]octa-siloxan-7-yl)propyl acrylate, 3-(13-trimethylsiloxy-1,3,5,9,11,13,15-heptamethyl-7-methyltetracyclo[9.5.1.1^{3,9}.1^{5,15}]octa-siloxan-7-yl)propyl acrylate, 3-(13-triethylsiloxy-1,3,5,9,11,13,15-heptamethyl-7-methyltetracyclo[9.5.1.1^{3,9}.1^{5,15}]octa-siloxan-7-yl)propyl acrylate, 3-(13-trimethylsiloxy-1,3,5,9,11,13,15-heptamethyl-7-methyltetracyclo[9.5.1.1^{3,9}.1^{5,15}]octa-siloxan-7-yl)propyl methacrylate, 3-(13-trimethylsiloxy-1,3,5,9,11,13,15-heptaethyl-7-methyltetracyclo[9.5.1.1^{3,9}.1^{5,15}]octa-siloxan-7-yl)propyl methacrylate, 3-(13-trimethylsiloxy-1,3,5,9,11,13,15-heptacyclopentyl-7-methyltetracyclo[9.5.1.1^{3,9}.1^{5,15}]octa-siloxan-7-yl)propyl methacrylate, 3-(13-trimethylsiloxy-1,3,5,9,11,13,15-hepta-isobutyl-7-methyltetracyclo[9.5.1.1^{3,9}.1^{5,15}]octa-siloxan-7-yl)propyl methacrylate, 3-(13-trimethylsiloxy-1,3,5,9,11,13,15-heptacycloheptyl-7-methyltetracyclo[9.5.1.1^{3,9}.1^{5,15}]octa-siloxan-7-yl)propyl methacrylate, 3-(13-tert-butyldimethylsiloxy-1,3,5,9,11,13,15-heptacycloheptyl-7-methyltetracyclo[9.5.1.1^{3,9}.1^{5,15}]octa-siloxan-7-yl)propyl methacrylate, 3-(13-dimethyl-1,1,1-trifluoropropylsiloxy-1,3,5,9,11,13,15-heptacycloheptyl-7-methyltetracyclo[9.5.1.1^{3,9}.1^{5,15}]octa-siloxan-7-yl)propyl methacrylate, 3-(13-dimethyl-3,3,3,4,4,4,5,5,5,6,6,6,7,7,7,8,8,8-octadecafluoroctylsiloxy-1,3,5,9,11,13,15-heptacycloheptyl-7-methyltetracyclo[9.5.1.1^{3,9}.1^{5,15}]octa-siloxan-7-yl)propyl methacrylate;

the monomer generating the repeating unit of Structure (IC) after polymerization is a monomer selected from the group consisting of 3-[(7,14-dihydroxy-1,3,5,7,9,11,14-heptamethyltricyclo[7.3.3.1^{5,11}]heptasiloxan-3-yloxy)dimethylsilyl]propyl acrylate, 3-[(7,14-dihydroxy-1,3,5,7,9,11,14-

heptamethyltricyclo[7.3.3.1^{5,11}]heptasiloxan-3-yloxy)dimethylsilyl]propyl
 methacrylate, -[(7,14-dihydroxy-1,3,5,7,9,11,14-
 heptaethyltricyclo[7.3.3.1^{5,11}]heptasiloxan-3-yloxy)dimethylsilyl]propyl
 methacrylate, 3-[(7,14-dihydroxy-1,3,5,7,9,11,14-
 5 heptaisobutyltricyclo[7.3.3.1^{5,11}]heptasiloxan-3-yloxy)dimethylsilyl]propyl
 methacrylate, 3-[(7,14-dihydroxy-1,3,5,7,9,11,14-
 heptacyclopentyltricyclo[7.3.3.1^{5,11}]heptasiloxan-3-yloxy)dimethylsilyl]propyl
 methacrylate, 3-[(7,14-dihydroxy-1,3,5,7,9,11,14-
 heptacyclohexyltricyclo[7.3.3.1^{5,11}]heptasiloxan-3-yloxy)dimethylsilyl]propyl
 10 methacrylate, 3-[(7,14-dihydroxy-1,3,5,7,9,11,14-
 heptamethyltricyclo[7.3.3.1^{5,11}]heptasiloxan-3-yloxy)dimethylsilyl]butyl
 acrylate, 3-[(7,14-di(trimethylsiloxy)-1,3,5,7,9,11,14-
 heptamethyltricyclo[7.3.3.1^{5,11}]heptasiloxan-3-yloxy)dimethylsilyl]propyl
 acrylate.

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18. The copolymer of claim 1 wherein the R¹² in the repeating unit of Structure (III) is an acid labile group selected from the group consisting of tert-butyl group, 1,1-dimethylpropyl group, 1-methyl-1-ethylpropyl group, 1,1-diethylpropyl group, 1,1-dimethylbutyl group, 1-methyl-1-ethylbutyl group, 1,1-diethyl butyl group, 1,1-dimethylpentyl group, 1-methyl-1-ethylpentyl group, 1,1-diethylpentyl group, 1,1-dimethylhexyl group, 1-methyl-1-ethylhexyl group, 1,1-diethylhexyl group and the like, 1-methyl-1-cyclopentyl, 1-ethyl-1-cyclopentyl, 1-propyl-1-cyclopentyl, 1-butyl-1-cyclopentyl, 1-methyl-1-cyclohexyl, 1-ethyl-1-cyclohexyl, 1-propyl-1-cyclohexyl, 1-butyl-1-cyclohexyl, 2-methyl-2-adamantyl, 2-ethyl-2-adamantyl, 2-propyl-2-adamantyl, 2-butyl-2-adamantyl, and 2-isopropyl-2-adamantyl and 1,1-dimethyl-3-oxobutyl, 1-ethyl-1-methyl-3-oxobutyl, 1-methyl-1-cyclohexyl-3-oxobutyl, 1,1-dimethyl-3-oxopentyl, and tetrahydropyran-2-yl; and
 20 the monomer generating the repeating unit of Structure (VI) after polymerization is a monomer selected from the group consisting of maleic anhydride, citraconic anhydride and 2,3-dimethylmaleic anhydride.

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19. A copolymer of claim 1 comprising repeating units of Structures (I), (III) and (IV) and additionally comprising a repeating unit having an unprotected alkali solubilizing moiety.

5 20. A copolymer of claim 19 wherein the repeating unit having unprotected alkali solubilizing units has alkali solubilizing units selected from the group consisting of phenolic, groups, carboxylic acids and fluorinated alcohols.

10 21. A copolymer of claim 20 wherein the repeating unit having an unprotected alkali solubilizing moiety is a repeating unit from hydroxystyrene, hydroxystyrene precursors, acrylic acid, methacrylic acid and 4-[2-1,1,1,3,3,3-hexafluoro-2-hydroxy)-propyl]styrene.

22. A photosensitive composition comprising:

15 (a) a copolymer of claim 1;
(b) a photoacid generator;
(c) a solvent; and.
(d) optionally a base.

20 23. A photosensitive composition comprising:

a. a copolymer of claim 2;
b. a photoacid generator; and
c. a solvent; and
d. optionally a base.

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23. A photosensitive composition comprising:

a. a copolymer of claim 3;
b. a photoacid generator;
c. a solvent; and
d. optionally a base.

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25. A photosensitive composition comprising:

- e. a copolymer of claim 4;
- f. a photoacid generator;
- g. a solvent; and
- h. optionally a base.

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26. A photosensitive composition comprising:

- a. a copolymer of claim 5;
- b. a photoacid generator;
- c. a solvent; and
- d. optionally a base.

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27. A photosensitive composition comprising:

- a. a copolymer of claim 6;
- b. a photoacid generator;
- c. a solvent; and
- d. optionally a base.

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28. A photosensitive composition comprising:

- a. a copolymer of claim 7;
- b. a photoacid generator;
- c. a solvent; and
- d. optionally a base.

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29. A photosensitive composition comprising:

- a. a copolymer of claim 8;
- b. a photoacid generator;
- c. a solvent; and
- d. optionally a base.

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30. 30. A photosensitive composition comprising:

- a. a copolymer of claim 9;
- b. a photoacid generator;

- c. a solvent; and
- d. optionally a base.

31. A photosensitive composition comprising:

- 5 a. a copolymer of claim 10;
- b. a photoacid generator;
- c. a solvent; and
- d. optionally a base.

10 32. A photosensitive composition comprising:

- a. a copolymer of claim 11;
- b. a photoacid generator;
- c. a solvent and
- d. optionally a base.

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33. A photosensitive composition comprising:

- a. a copolymer of claim 12;
- b. a photoacid generator;
- c. a solvent; and
- d. optionally a base.

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34. A photosensitive composition comprising:

- a. a copolymer of claim 13;
- b. a photoacid generator;
- 25 c. a solvent; and
- d. optionally a base.

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35. A photosensitive composition comprising:

- a. a copolymer of claim 14;
- 30 b. a photoacid generator;
- c. a solvent; and
- d. optionally a base.

36. A photosensitive composition comprising:

- a. a copolymer of claim 15;
- b. a photoacid generator;
- c. a solvent; and
- d. optionally a base.

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37. A photosensitive composition comprising:

- a. a copolymer of claim 16;
- b. a photoacid generator;
- c. a solvent; and
- d. optionally a base.

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38. A photosensitive composition comprising:

- 15 a. a copolymer of claim 17;
- b. a photoacid generator;
- c. a solvent; and
- d. optionally a base.

20 39. A photosensitive composition comprising:

- a. a copolymer of claim 18;
- b. a photoacid generator;
- c. a solvent; and
- d. optionally a base.

25 40. A photosensitive composition comprising:

- a. a copolymer of claim 19;
- b. a photoacid generator;
- c. a solvent; and
- d. optionally a base.

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41. A photosensitive composition comprising:

- a. a copolymer of claim 20;
- b. a photoacid generator;
- c. a solvent; and
- d. optionally a base.

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42. A photosensitive composition comprising:

- a. a copolymer of claim 21;
- b. a photoacid generator;
- c. a solvent; and
- d. optionally a base.

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43. A photosensitive composition of claim 22 wherein the optional base is present and is selected from the group consisting of 2-methylimidazole, triisopropylamine, 4-dimethylaminopyridine, 4,4'-diaminodiphenyl ether, 2,4,5 triphenyl imidazole and 1,5-diazobicyclo[4.3.0]non-5-ene.

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44. A process for producing a patterned image on a substrate, the process comprising the steps of:

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- a. coating on a suitable undercoated substrate a photosensitive composition of claim 22, thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

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45. A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated photosensitive composition of claim 23, thereby forming a coated substrate;

- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

46. A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated photosensitive composition of claim 24, thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

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47. A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated substrate a photosensitive composition of claim 25 thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

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48. A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated substrate a photosensitive composition of claim 26, thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

15 49. A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated substrate a photosensitive composition of claim 27 thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

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50. A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated substrate a photosensitive composition of claim 28, thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;

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- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

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51. A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated substrate a photosensitive composition of claim 29, thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

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52. A process for producing a patterned image on a substrate, the process comprising the steps of:

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- a. coating on a suitable undercoated substrate a photosensitive composition of claim 30, thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

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53. A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated substrate a photosensitive

composition of claim 31, thereby forming a coated substrate;

- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- 5 e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- g. removing the undercoat in an area unprotected by the photosensitive composition.

10 54 A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated substrate a photosensitive composition of claim 32, thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- 15 e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

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55. A process for producing a patterned image on a substrate, the process comprising the steps of:

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- a. coating on a suitable undercoated substrate a photosensitive composition of claim 33, thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- 30 e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

56 A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated substrate a photosensitive composition of claim 34, thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

57. A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated photosensitive composition of claim 35 thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition

25 58. A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated substrate a photosensitive composition of claim 36 thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;

- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- g. removing the undercoat in an area unprotected by the photosensitive composition

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59 A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated substrate a photosensitive composition of claim 37 thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

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60. A process for producing a patterned image on a substrate, the process comprising the steps of:

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- a. coating on a suitable undercoated substrate a photosensitive composition of claim 38 thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

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30 61. A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated substrate a photosensitive

composition of claim 39 thereby forming a coated substrate;

- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- 5 e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

10 62. A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated substrate a photosensitive composition of claim 40 thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

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63. A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated substrate a photosensitive composition of claim 41 thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

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64. A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable undercoated substrate a photosensitive composition of claim 42 thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate;
- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate; and
- f. removing the undercoat in an area unprotected by the photosensitive composition.

10 65. A process for producing a patterned image on a substrate, the process comprising the steps of:

- a. coating on a suitable substrate a photosensitive composition of claim 22 thereby forming a coated substrate;
- b. prebaking the coated substrate;
- c. exposing the prebaked coated substrate to actinic radiation;
- d. optionally post-baking the exposed coated substrate; and
- e. developing the exposed coated substrate with a developer thereby forming an uncured relief image on the coated substrate.

15 66. A patterned substrate produced by the process of claim 44.

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67. A patterned substrate produced by the process of claim 45.

25 68. A patterned substrate produced by the process of claim 52.